IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended)   A method for ~~deriving a transform matrix~~ processing data, comprising:

using a transform matrix to process the data where the transform matrix is ~~deriving values for~~ a 2^m x 2^m transform matrix ~~using~~ that uses the following normalization constraints:

$$
\begin{cases}
n_0 = norm \\
\sum_{i=0}^{2^{m-1}-1} n_{2 \cdot i+1}^2 = 2^{m-1} \cdot norm^2 \\
\sum_{i=0}^{2^{m-2}-1} n_{4 \cdot i+2}^2 = 2^{m-2} \cdot norm^2 \\
\sum_{i=0}^{2^{m-3}-1} n_{8 \cdot i+4}^2 = 2^{m-3} \cdot norm^2 \\
\vdots \\
n_{2^{m}-1} = norm
\end{cases}
$$

where, *norm* is an integer representing a normalization factor of the transform matrix; and

selecting the *norm* that minimizes a DCT distortion function:

$$
E_{2^m} = \frac{1}{2^m} \sum_{i=0}^{(2^m-1)} \sum_{\substack{j=0 \\ j \neq i}}^{(2^m-1)} \frac{|d_i(j)|}{|d_i(i)|}
$$

where $d_i = t_i \cdot DCT$, t_i is a base vector of the transform matrix, and DCT is a real Discrete Cosine Transform.

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2. (Currently Amended)   ~~A~~ The method according to claim 1 wherein m = 16 and the values of the transform matrix comprise the following:

$$
T_{16} =
\begin{bmatrix} t_0 \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \\ t_{10} \\ t_{11} \\ t_{12} \\ t_{13} \\ t_{14} \\ t_{15} \end{bmatrix}
=
\begin{bmatrix}
n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 \\
n_1 & n_3 & n_5 & n_7 & n_9 & n_{11} & n_{13} & n_{15} & -n_{15} & -n_{13} & -n_{11} & -n_9 & -n_7 & -n_5 & -n_3 & -n_1 \\
n_2 & n_6 & n_{10} & n_{14} & -n_{14} & -n_{10} & -n_6 & -n_2 & -n_2 & -n_6 & -n_{10} & -n_{14} & n_{14} & n_{10} & n_6 & n_2 \\
n_3 & n_9 & n_{15} & -n_{11} & -n_5 & -n_1 & -n_7 & -n_{13} & n_{13} & n_7 & n_1 & n_5 & n_{11} & -n_{15} & -n_9 & -n_3 \\
n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 & n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 \\
n_5 & n_{15} & -n_7 & -n_3 & -n_{13} & n_9 & n_1 & n_{11} & -n_{11} & -n_1 & -n_9 & n_{13} & n_3 & n_7 & -n_{15} & -n_5 \\
n_6 & -n_{14} & -n_2 & -n_{10} & n_{10} & n_2 & n_{14} & -n_6 & -n_6 & n_{14} & n_2 & n_{10} & -n_{10} & -n_2 & -n_{14} & n_6 \\
n_7 & -n_{11} & -n_3 & n_{15} & n_1 & n_{13} & -n_5 & -n_9 & n_9 & n_5 & -n_{13} & -n_1 & -n_{15} & n_3 & n_{11} & -n_7 \\
n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 \\
n_9 & -n_5 & -n_{13} & n_1 & -n_{15} & -n_3 & n_{11} & n_7 & -n_7 & -n_{11} & n_3 & n_{15} & -n_1 & n_{13} & n_5 & -n_9 \\
n_{10} & -n_2 & n_{14} & n_6 & -n_6 & -n_{14} & n_2 & -n_{10} & -n_{10} & n_2 & -n_{14} & -n_6 & n_6 & n_{14} & -n_2 & n_{10} \\
n_{11} & -n_1 & n_9 & n_{13} & -n_3 & n_7 & n_{15} & -n_5 & n_5 & -n_{15} & -n_7 & n_3 & -n_{13} & -n_9 & n_1 & -n_{11} \\
n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} & n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} \\
n_{13} & -n_7 & n_1 & -n_5 & n_{11} & n_{15} & -n_9 & n_3 & -n_3 & n_9 & -n_{15} & -n_{11} & n_5 & -n_1 & n_7 & -n_{13} \\
n_{14} & -n_{10} & n_6 & -n_2 & n_2 & -n_6 & n_{10} & -n_{14} & -n_{14} & n_{10} & -n_6 & n_2 & -n_2 & n_6 & -n_{10} & n_{14} \\
n_{15} & -n_{13} & n_{11} & -n_9 & n_7 & -n_5 & n_3 & -n_1 & n_1 & -n_3 & n_5 & -n_7 & n_9 & -n_{11} & n_{13} & -n_{15}
\end{bmatrix}
$$

where,

$n_0 = 17$, $n_1 = 22$, $n_2 = 24$, $n_3 = 28$, $n_4 = 23$, $n_5 = 12$, $n_6 = 20$, $n_7 = 20$,

$n_8 = 17$, $n_9 = 12$, $n_{10} = 12$, $n_{11} = 16$, $n_{12} = 7$, $n_{13} = 8$, $n_{14} = 6$, and $n_{15} = 6$.

3. (Currently Amended)   ~~A~~ The method according to claim 1 including:
receiving variable sized macroblocks of image data;
selecting transform matrices corresponding to the variable sized macroblocks; and
applying the selected transform matrices to the macroblocks.

4. (Currently Amended)   ~~A~~ The method according to claim 1 including using different 4 x 4, 8 x 8, and 16 x 16 transform matrices for Discrete Cosine Transforming different blocks of an image in the data.

5. (Original)   A method according to claim 1 including basing the constraints used for deriving the transform matrix on a Hadamard transform.

6. (Original)   A system for processing data, comprising:

a processor using a transform matrix:

$$
T_{16}=\begin{bmatrix} t_0 \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \\ t_{10} \\ t_{11} \\ t_{12} \\ t_{13} \\ t_{14} \\ t_{15} \end{bmatrix}=\begin{bmatrix}
n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 \\
n_1 & n_3 & n_5 & n_7 & n_9 & n_{11} & n_{13} & n_{15} & -n_{15} & -n_{13} & -n_{11} & -n_9 & -n_7 & -n_5 & -n_3 & -n_1 \\
n_2 & n_6 & n_{10} & n_{14} & -n_{14} & -n_{10} & -n_6 & -n_2 & -n_2 & -n_6 & -n_{10} & -n_{14} & n_{14} & n_{10} & n_6 & n_2 \\
n_3 & n_9 & n_{15} & -n_{11} & -n_5 & -n_1 & -n_7 & -n_{13} & n_{13} & n_7 & n_1 & n_{11} & -n_{15} & -n_9 & -n_3 \\
n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 & n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 \\
n_5 & n_{15} & -n_7 & -n_3 & -n_{13} & n_9 & n_1 & n_{11} & -n_{11} & -n_1 & -n_9 & n_{13} & n_3 & n_7 & -n_{15} & -n_5 \\
n_6 & -n_{14} & -n_2 & -n_{10} & n_{10} & n_2 & n_{14} & -n_6 & -n_6 & n_{14} & n_2 & n_{10} & -n_{10} & -n_2 & -n_{14} & n_6 \\
n_7 & -n_{11} & -n_3 & n_{15} & n_1 & n_{13} & -n_5 & -n_9 & n_9 & n_5 & -n_{13} & -n_1 & -n_{15} & n_3 & n_{11} & -n_7 \\
n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 \\
n_9 & -n_5 & -n_{13} & n_1 & -n_{15} & -n_3 & n_{11} & n_7 & -n_7 & -n_{11} & n_3 & n_{15} & -n_1 & n_{13} & n_5 & -n_9 \\
n_{10} & -n_2 & n_{14} & n_6 & -n_6 & -n_{14} & n_2 & -n_{10} & -n_{10} & n_2 & -n_{14} & -n_6 & n_6 & n_{14} & -n_2 & n_{10} \\
n_{11} & -n_1 & n_9 & n_{13} & -n_3 & n_7 & n_{15} & -n_5 & n_5 & -n_{15} & -n_7 & n_3 & -n_{13} & -n_9 & n_1 & -n_{11} \\
n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} & n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} \\
n_{13} & -n_7 & n_1 & -n_5 & n_{11} & n_{15} & -n_9 & n_3 & -n_3 & n_9 & -n_{15} & -n_{11} & n_5 & -n_1 & n_7 & -n_{13} \\
n_{14} & -n_{10} & n_6 & -n_2 & n_2 & -n_6 & n_{10} & -n_{14} & -n_{14} & n_{10} & -n_6 & n_2 & -n_2 & n_6 & -n_{10} & n_{14} \\
n_{15} & -n_{13} & n_{11} & -n_9 & n_7 & -n_5 & n_3 & -n_1 & n_1 & -n_3 & n_5 & -n_7 & n_9 & -n_{11} & n_{13} & -n_{15}
\end{bmatrix}
$$

to transform the data, where:

$n_0 = 17$, $n_1 = 22$, $n_2 = 24$, $n_3 = 28$, $n_4 = 23$, $n_5 = 12$, $n_6 = 20$, $n_7 = 20$,

$n_8 = 17$, $n_9 = 12$, $n_{10} = 12$, $n_{11} = 16$, $n_{12} = 7$, $n_{13} = 8$, $n_{14} = 6$, and $n_{15} = 6$.

7. (Currently Amended) A system according to claim 6 wherein the processor conducts a discrete cosine transform on the data according to the following:

$$C_{nxm} = T_m \times B_{nxm} \times T_n^T,$$

where B_{nxm} is an image block of data with n ~~pixels~~ columns and m rows, T_n and T_m are the horizontal and vertical transform matrices of size $n \times n$ and $m \times m$, respectively, and C_{nxm} denotes the cosine transformed $n \times m$ image block.

8. (Currently Amended)   A system according to claim 6 wherein the processor conducts an inverse discrete cosine transform on the data according to the following:

$$B_{nxm} = T_m^T \times C_{nxm} \times T_n,$$

where B_{nxm} denotes the inverse discrete cosine transformed image block with n ~~pixels~~ columns and m rows, T_n and T_m represent the horizontal and vertical integer transform matrices of size $n \times n$ and $m \times m$, respectively, and C_{nxm} denotes a cosine transformed $n \times m$ image block.

9. (Original)   A system according to claim 6 wherein the system is a device that receives, stores or transmits image data.

10. (Original)   A system according to claim 6 including a memory that stores the transform matrix.

11. (Previously Presented)   A system according to claim 10 wherein the memory stores different sized transform matrices, and the processor applies the different sized transform matrices according to a block size for a portion of the data being transformed.

12. (Previously Presented)   A system according to claim 6 wherein the transform matrix is used for digital video coding.

13. (New) An article of manufacture comprising computer-readable media containing instructions that, when executed or interpreted by a digital processor or cooperating processors, cause that processor or processors to perform a method of processing data, the method comprising:

using a transform matrix to process the data where the transform matrix is a $2^m \times 2^m$ transform matrix that uses the following normalization constraints:

$$\begin{cases} n_0 = norm \\ \sum_{i=0}^{2^{m-1}-1} n_{2 \cdot i+1}^2 = 2^{m-1} \cdot norm^2 \\ \sum_{i=0}^{2^{m-2}-1} n_{4 \cdot i+2}^2 = 2^{m-2} \cdot norm^2 \\ \sum_{i=0}^{2^{m-3}-1} n_{8 \cdot i+4}^2 = 2^{m-3} \cdot norm^2 \\ \vdots \\ n_{2^{m-1}} = norm \end{cases}$$

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where, *norm* is an integer representing a normalization factor of the transform matrix; and

selecting the *norm* that minimizes a DCT distortion function:

$$E_{2^-} = \frac{1}{2^m} \sum_{i=0}^{(2^m-1)} \sum_{\substack{j=0 \\ j \neq i}}^{(2^m-1)} \frac{|d_t(j)|}{|d_t(i)|}$$

where $d_t = t_i \cdot DCT$, t_i is a base vector of the transform matrix, and DCT is a real Discrete Cosine Transform.

14. (New) The article of manufacture of claim 13, wherein m = 16 and the values of the transform matrix comprise the following:

$$T_{16} = \begin{bmatrix} t_0 \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \\ t_{10} \\ t_{11} \\ t_{12} \\ t_{13} \\ t_{14} \\ t_{15} \end{bmatrix} = \begin{bmatrix} n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 \\ n_1 & n_3 & n_5 & n_7 & n_9 & n_{11} & n_{13} & n_{15} & -n_{15} & -n_{13} & -n_{11} & -n_9 & -n_7 & -n_5 & -n_3 & -n_1 \\ n_2 & n_6 & n_{10} & n_{14} & -n_{14} & -n_{10} & -n_6 & -n_2 & -n_2 & -n_6 & -n_{10} & -n_{14} & n_{14} & n_{10} & n_6 & n_2 \\ n_3 & n_9 & n_{15} & -n_{11} & -n_5 & -n_1 & -n_7 & -n_{13} & n_{13} & n_7 & n_1 & n_5 & n_{11} & -n_{15} & -n_9 & -n_3 \\ n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 & n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 \\ n_5 & n_{15} & -n_7 & -n_3 & -n_{13} & n_9 & n_1 & n_{11} & -n_{11} & -n_1 & -n_9 & n_{13} & n_3 & n_7 & -n_{15} & -n_5 \\ n_6 & -n_{14} & -n_2 & -n_{10} & n_{10} & n_2 & n_{14} & -n_6 & -n_6 & n_{14} & n_2 & n_{10} & -n_{10} & -n_2 & -n_{14} & n_6 \\ n_7 & -n_{11} & -n_3 & n_{15} & n_1 & n_{13} & -n_5 & -n_9 & n_9 & n_5 & -n_{13} & -n_1 & -n_{15} & n_3 & n_{11} & -n_7 \\ n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 \\ n_9 & -n_5 & -n_{13} & n_1 & -n_{15} & -n_3 & n_{11} & n_7 & -n_7 & -n_{11} & n_3 & n_{15} & -n_1 & n_{13} & n_5 & -n_9 \\ n_{10} & -n_2 & n_{14} & n_6 & -n_6 & -n_{14} & n_2 & -n_{10} & -n_{10} & n_2 & -n_{14} & -n_6 & n_6 & n_{14} & -n_2 & n_{10} \\ n_{11} & -n_1 & n_9 & n_{13} & -n_3 & n_7 & n_{15} & -n_5 & n_5 & -n_{15} & -n_7 & n_3 & -n_{13} & -n_9 & n_1 & -n_{11} \\ n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} & n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} \\ n_{13} & -n_7 & n_1 & -n_5 & n_{11} & n_{15} & -n_9 & n_3 & -n_3 & n_9 & -n_{15} & -n_{11} & n_5 & -n_1 & n_7 & -n_{13} \\ n_{14} & -n_{10} & n_6 & -n_2 & n_2 & -n_6 & n_{10} & -n_{14} & -n_{14} & n_{10} & -n_6 & n_2 & -n_2 & n_6 & -n_{10} & n_{14} \\ n_{15} & -n_{13} & n_{11} & -n_9 & n_7 & -n_5 & n_3 & -n_1 & n_1 & -n_3 & n_5 & -n_7 & n_9 & -n_{11} & n_{13} & -n_{15} \end{bmatrix}$$

where,

$n_0 = 17$, $n_1 = 22$, $n_2 = 24$, $n_3 = 28$, $n_4 = 23$, $n_5 = 12$, $n_6 = 20$, $n_7 = 20$,

$n_8 = 17$, $n_9 = 12$, $n_{10} = 12$, $n_{11} = 16$, $n_{12} = 7$, $n_{13} = 8$, $n_{14} = 6$, and $n_{15} = 6$.

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15. (New) The article of manufacture of claim 13 including to claim 13 including:
receiving variable sized macroblocks of image data;
selecting transform matrices corresponding to the variable sized macroblocks; and
applying the selected transform matrices to the macroblocks.

16. (New) The article of manufacture of claim 13 including using different 4 x 4, 8 x 8, and 16 x 16 transform matrices for Discrete Cosine Transforming different blocks of an image in the data.

17. (New) The article of manufacture of claim 13 including basing the constraints used for deriving the transform matrix on a Hadamard transform.